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65913 7590 12/28/2009

NXP, B.V.
NXP INTELLECTUAL PROPERTY & LICENSING
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131

EXAMINER

NGUYEN, TRONG H

ART UNIT

PAPER NUMBER

2436

DATE MAILED: 12/28/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/559,917

12/07/2005

Thomas Rottschäfer

DE030203US1

9587

TITLE OF INVENTION: PROCESSOR FOR ENCRYPTING AND/OR DECRYPTING DATA AND METHOD OF ENCRYPTING AND/OR DECRYPTING DATA USING SUCH A PROCESSOR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	03/29/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

65913 7590 12/28/2009

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SAN JOSE, CA 95131

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/559,917 12/07/2005 Thomas Rottschäfer DE030203US1 9587

TITLE OF INVENTION: PROCESSOR FOR ENCRYPTING AND/OR DECRYPTING DATA AND METHOD OF ENCRYPTING AND/OR DECRYPTING DATA USING SUCH A PROCESSOR

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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nonprovisional NO \$1510 \$300 \$0 \$1810 03/29/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
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NGUYEN, TRONG H 2436 713-189000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

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Date _____

Typed or printed name _____

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This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,917	12/07/2005	Thomas Rottschäfer	DE030203US1	9587
65913	7590	12/28/2009	EXAMINER	
NXP, B.V. NXP INTELLECTUAL PROPERTY & LICENSING M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			NGUYEN, TRONG H	
			ART UNIT	PAPER NUMBER
			2436	
			DATE MAILED: 12/28/2009	

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 613 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 613 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability

Application No.

10/559,917

Applicant(s)

ROTTSCHAER ET AL.

Examiner

TRONG NGUYEN

Art Unit

2436

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 10/22/2009.
2. ☒ The allowed claim(s) is/are 1-17.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 12/18/2009.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

This Examiner Amendment and Reasons for Allowance action is in response to the filing of 10/22/2009.

Drawings

1. The drawing is objected to because "FIG." should be "FIG. 1". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicants, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone discussion with Patrick Wamsley on 11/13/2009.

➤ The application has been amended as follows:

Amendments to the Claims:

1. (Currently Amended) A processor that performs an encryption/decryption operation, the processor comprising:

a control device that receives at least one initial key, the control device comprising:

a memory that temporarily stores the at least one initial key, and

at least one external key input that receives the at least one initial key from a source;

a round key generator connected to the control device via at least one communication device, wherein the round key generator receives the at least one initial key from the control device to calculate at least one round key and transfers the at least one round key to the memory of the control device;

at least one encryption/decryption device comprising:

at least one external data input that receives external data,

an input that receives the at least one round key from the memory of the control device, and

at least one external data output that outputs the external data processed encrypted or decrypted with the at least one round key by the at least one encryption/decryption device, wherein the at least one encryption/decryption device and the round key generator communicate solely via the control device, and the control device transmits intermediate results to the round key generator to perform recursive calculation of the at least one round key;

a first request line that sends requests from the at least one encryption/decryption device to the control device; and

a second request line that sends requests from the round key generator to the control device, wherein the at least one encryption/decryption device and the round key generator both transmit requests on the respective first and second request lines to start the encryption/decryption operation after both requests are met, wherein the encryption/decryption operation is repeated as often as necessary, except for receiving the at least one initial key by the control device, to encrypt or decrypt a set of external data.

2. (Previously Presented) The processor of claim 1, wherein the at least one communication device further comprises:

first and second release lines; and

first and second data lines

3. (Previously Presented) The processor of claim 2, wherein the first and second request lines, the first and second release lines, and the second data lines at least partially use a single physical path.

4. (Previously Presented) The processor of claim 1, wherein the at least one round key is temporarily stored in the memory of the control device.

5. (Previously Presented) The processor of claim 1, wherein the at least one round key is accessed using a rotating pointer.

6. (Previously Presented) The processor of claim 1, wherein the communication between the control device and the at least one encryption/decryption device and between the control device and the round key generator is accomplished using at least one handshake protocol.

7. (Previously Presented) The processor of claim 1, wherein the operation of the of the control device, of the at least one encryption/decryption device, and of the round key generator are asynchronous with respect to one another.

8. (Previously Presented) The processor of claim 1, wherein the round key generator performs a dummy operation.

9. (Previously Presented) The processor of claim 1, wherein a time between the calculating of the at least one round key by the round key generator and the processing of the external data using the at least one round key is variable.

10. (Previously Presented) The processor of claim 1, wherein the processor is an Advanced Encryption Standard (AES) coprocessor.

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11. (Currently Amended) A method of performing an encryption/decryption operation using a processor, the method comprising:

sending a first request on a first request line from at least one encryption/decryption device to a control device and a second request on a second request line from a round key generator to the control device to start the encryption/decryption operation after both requests are met, wherein the at least one encryption/decryption device and the round key generator communicate solely via the control device;

reading at least one initial key into the control device, wherein the at least one initial key is obtained from a source other than the round key generator;

reading external data into the at least one encryption/decryption device;

reading at least one data word needed to calculate at least one round key from at least one storage device of the control device;

transferring the at least one data word to the round key generator;

calculating at least one round key recursively on the basis of the at least one data word by using the round key generator;

transferring the at least one round key to the control device;

storing the at least one round key in the at least one storage device;

transferring the at least one round key from the at least one storage device to the at least one encryption/decryption device;

~~processing~~ encrypting or decrypting the external data by using the at least one encryption/decryption device, using the at least one round key, and the ~~processed~~ encrypted or decrypted external data are made available ~~[[at]]~~ to at least one external data output; and

repeating the method as often as necessary, except for reading the at least one initial key into the control device, to encrypt or decrypt a set of external data,

wherein the control device transmits intermediate results to the round key generator to perform recursive calculation of the at least one round key.

12. (Previously Presented) The method of claim 11, wherein communication between the control device and the at least one encryption/decryption device, and between the control device and the round key generator is accomplished using at least one handshake protocol.

13. (Previously Presented) The method of claim 11, wherein the operation of the control device, of the at least one encryption/decryption device, and of the round key generator are asynchronous with respect to one another.

14. (Previously Presented) The method of claim 11, wherein the at least one round key is accessed using a rotating pointer.

15. (Previously Presented) The method of claim 11, further comprising:

performing a dummy operation using the round key generator.

16. (Previously Presented) The method of claim 11, wherein a time between the calculating of the at least one round key by the round key generator and the processing of the external data using the at least one round key is variable.

17. (Previously Presented) The method of claim 11, wherein the processor is an Advanced Encryption Standard (AES) coprocessor.

Allowance

3. Claims 1-17 amended above and are believed to overcome the examiner's prior rejections and objections. Therefore, the examiner withdraws all outstanding rejections and objections to claims 1-17.

4. Claims 1-17 are allowed.

Examiner's Statement of Reasons for Allowance

5. Prior art was found which disclosed "data communication system and method with data scrambling", "high throughput AES architecture", "search mechanism for a rotating pointer buffer", "computer architecture a quantitative approach" and "encryption apparatus, decryption apparatus, expanded key generating apparatus and method therefor, and recording medium" [i.e. Matsui (US 5,261,003), Verbauwhede (US 2003/0202658 A1), Tran (US 5,919,251), Hennessy et al., Computer Architecture A Quantitative Approach, 2nd ed., Morgan Kaufmann, January 1996, and Muratani et al. (US 2002/0021802 A1)].

6. The following is an examiner's statement of reasons for allowance:

- The prior art of record do not teach or render obvious the limitations as recited in independent claims 1 and 11, specific to "a first request line that sends requests from the at least one encryption/decryption device to the

control device” and “a second request line that sends requests from the round key generator to the control device, wherein the at least one encryption/decryption device and the round key generator both transmit requests on the respective first and second request lines to start the encryption/decryption operation after both requests are met” and “sending a first request on a first request line from at least one encryption/decryption device to a control device and a second request on a second request line from a round key generator to the control device to start the encryption/decryption operation after both requests are met”.

- Therefore, the examiner considers the combination of at least the independent claim limitations, “a control device that receives at least one initial key, the control device comprising: a memory that temporarily stores the at least one initial key, and at least one external key input that receives the at least one initial key from a source;” and “a round key generator connected to the control device via at least one communication device, wherein the round key generator receives the at least one initial key from the control device to calculate at least one round key and transfers the at least one round key to the memory of the control device;” and “at least one encryption/decryption device comprising: at least one external data input that receives external data,

an input that receives the at least one round key from the memory of the control device, and at least one external data output that outputs the external data encrypted or decrypted with the at least one round key by the at least one encryption/decryption device, wherein the at least one encryption/decryption device and the round key generator communicate solely via the control device, and the control device transmits intermediate results to the round key generator to perform recursive calculation of the at least one round key” and “wherein the encryption/decryption operation is repeated as often as necessary, except for receiving the at least one initial key by the control device, to encrypt or decrypt a set of external data” and “wherein the at least one encryption/decryption device and the round key generator communicate solely via the control device” and “reading at least one initial key into the control device, wherein the at least one initial key is obtained from a source other than the round key generator” and “reading external data into the at least one encryption/decryption device” and “reading at least one data word needed to calculate at least one round key from at least one storage device of the control device” and “transferring the at least one data word to the round key generator” and “calculating at least one round key recursively on the basis of the at least one data word by using the round key generator”

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and “transferring the at least one round key to the control device” and “storing the at least one round key in the at least one storage device” and “transferring the at least one round key from the at least one storage device to the at least one encryption/decryption device” and “encrypting or decrypting the external data by using the at least one encryption/decryption device, using the at least one round key, and the encrypted or decrypted external data are made available to at least one external data output” and “repeating the method as often as necessary, except for reading the at least one initial key into the control device, to encrypt or decrypt a set of external data” and “wherein the control device transmits intermediate results to the round key generator to perform recursive calculation of the at least one round key” with the above limitations not taught by the prior art of record, as applied to encryption/decryption operation, as the non-obvious novelties of the Applicants’ claimed invention.

- Dependent claims are allowed as they depend from allowable independent claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TRONG NGUYEN whose telephone number is (571)270-7312. The examiner can normally be reached on Monday through Thursday 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NASSER MOAZZAMI can be reached on (571)272-4195. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nasser Moazzami/
Supervisory Patent Examiner, Art Unit 2436

/T N/
Examiner, Art Unit 2436